LONG-TERM EXPOSURE TO AIR POLLUTION ($PM_{2.5}$ AND NO_2) AND MORTALITY: RESULTS OF THE ROME LONGITUDINAL STUDY (ROLS)

Cesaroni G. *Department of Epidemiology, Lazio Regional Health Service, Italy*
Gariazzo C. *Italian Workers' Compensation Authority (INAIL), Italy*
Sozzi R. *Regional Environmental Protection Agency, Italy*
Badaloni C. *Department of Epidemiology, Lazio Regional Health Service, Italy*
Davoli M. *Department of Epidemiology, Lazio Regional Health Service, Italy*
Forastiere F. *Department of Epidemiology, Lazio Regional Health Service, Italy*

Background and aims: There are few longitudinal studies evaluating the role of chronic exposure to air pollutants within the same urban setting. We analyzed the association of long-term exposure to $PM_{2.5}$ and NO_2 with mortality in a large cohort.
Methods: The Rome Longitudinal Study is a fixed cohort enrolled at the 2001 census. We selected subjects aged 45-80 years at the baseline who had not changed their address in the previous five years (n=684,204). Exposure at residence to $PM_{2.5}$, was predicted by means of a chemical transport model (FARM) (1 km^2 grid) using 2005 emissions data. Spatial levels of NO_2 were derived from a specific land use regression model (R^2=0.66). We had information on age, gender, education, occupation, place of birth, and area-based socioeconomic position at baseline. All subjects were followed till December 31, 2006. Cox regression models were used to study the association between the exposure and cause-specific mortality, taking several confounders into account.
Results: During the study period, 45,006 natural deaths occurred (33% cardiovascular, 5% respiratory disorders, 3.3% diabetes, and 12% lung cancer). The average exposure was 23 (sd 4) $\mu g/m^3$ for $PM_{2.5}$ and 44 (8) $\mu g/m^3$ for NO_2. The correlation of the two exposure indicators was 0.75. With increased exposure of $PM_{2.5}$ and NO_2 there was an increased risk of dying for natural causes: 7% (95%CI:4%-9%) for 10$\mu g/m^3$ increase of $PM_{2.5}$, and 9% (95%CI:6%-13%) for 10$\mu g/m^3$ increase of NO_2. The relationships were linear with no evidence of a threshold. The strongest associations were found for cardiovascular diseases and diabetes.
Conclusions: This is one of the largest European urban cohort study on $PM_{2.5}$. The results indicate that long-term exposures to $PM_{2.5}$, and NO_2 at residence are associated with mortality in Rome and the effect estimates are very similar to what has been suggested in studies from the USA.